

TRANSACTIONS
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- I. *On the Larvae of Hamanumida daedalus*, Fab., *Hoplitis phyllocampa*, n. sp., and *Eulophonotus myrmeleon*, Feld.; with descriptions of the Imagines of the two Heterocera. By ROLAND TRIMEN, M.A., F.R.S.

[Read October 7th, 1908.]

PLATE I.

I OWE to the kindness of my friend and correspondent for many years, Mr. Alfred D. Millar, of Durban, Natal, the interesting lepidopterous material here dealt with.

The hitherto unrecorded larva and the ♂ imago of the little known Cossid moth *Eulophonotus myrmeleon* were discovered by Mr. A. D. Millar himself at Durban; the ♂ imago being so strikingly dissimilar from the ♀ in its very small size and perfectly transparent wings that, unless they had been taken paired, it may well be doubted whether even a practised lepidopterist would have discerned them to be the sexes of the same species.

The other two larvae here described, viz.: those of *Hamanumida daedalus* and of *Hoplitis phyllocampa*, n. sp., are the discoveries, at Malvern, near Durban, of Mr. H. M. Millar, brother of Mr. A. D. Millar, and are of high interest as exhibiting—each in quite different fashion—a close protective resemblance to the leaves of their common food-plant. The concealment afforded by this resemblance may perhaps account in part for the long

delay in finding the larva of one of the most generally distributed of Tropical-African butterflies; and it is worthy of note that the discovery has occurred at what appears to be the extreme southern limit of the range of the species, viz. the Coast of Natal, where the butterfly is by no means common. The *Hamanumida* presents a method of protective resemblance for long well known in the case of the allied Indian genera *Adolias* (*Euthalia*) and *Symphacdra*, and more recently in that of the related African genus *Euphaedra*; but the larva of the Notodontid *Hoplitis phyllocampa*, n. sp., offers an entirely distinct mode of concealment, effected by a special adaptation of the combined three hinder abdominal segments—held erect and reversed in the attitude so characteristic of many Notodontid larva—in direct imitation of the leaf of the food-plant.

Family NYMPHALIDAE.

Sub-family NYMPHALINAE.

LARVA of *Hamanumida daedalus* (Fab.), Plate I, fig. 1.

Length 1 in. 5 lin.; width generally $2\frac{1}{2}$ lin., but head and first thoracic segment and anal segment only 2 lin.

Head unarmed; but on each succeeding segment, except first thoracic and anal segments, a latero-dorsal pair of long horizontally-projecting spines (10 pairs in all), tapering to a point and closely clothed with rather long fine bristles—which become shorter and sparser near tip. The first pair of these spines is directed forwards so as to obscure the outline of the first thoracic segment and of the head; the second and third pairs incline somewhat forward; the fourth, fifth, and sixth are nearly at right angles with the body; but the seventh, eighth, and ninth are increasingly inclined backward, and the tenth decidedly so. All the spines are about 4 lin. in length.

Along medio-dorsal line, a little anterior to bases of each pair of spines (except first, second, and tenth pairs), are two small elongate black spots rather widely apart from each other.

As regards colouring, the example under notice has suffered discoloration in formalin, being of a dull greenish-brown, whereas Mr. Millar describes it in life as “green, with a yellow stripe down middle of back.” The spines, however, retain much more green than the body, and their bristles are blackish or white in about equal numbers.

This larva is very similar to those of two West-African species of *Euphaedra*, vid. *E. ravola* (Hewits.), and (probably) either *E. janetta*, Butl., or *E. xypete* (Hewits.), figured by Aurivillius,* but is somewhat intermediate, having the narrower head and first thoracic segment shown in fig. 3, but the longer and more plumose latero-dorsal spines of fig. 4. The spines are, however, more tapering and acuminate than shown in either of the figures cited, and do not bear the single very long terminal bristle which is so marked a feature in both figures. Except for its very much shorter latero-dorsal spines, the larva of *H. daedalus* nearly approaches in structure, as well as in colouring, the larva of the well-known Indian Nymphaline, *Adolias* (*Euthalia*) *garuda*, Moore, as depicted by Hardwicke,† and it also very much resembles the profile figure of the larva of *A.* (*E.*) *vasanta*, Moore,‡ though wanting the yellow rays emitted at right angles by the median dorsal stripe which are shown in that figure.

De Nicéville's description in the footnote § of the Indian *Garuda* larva might have been written of the Natalian *H. daedalus* larva, as shown by Mr. Millar's descriptive notes and photograph of the latter at rest on a leaf of its food-plant, *Combretum guienzii*, Sond.||

It is satisfactory to find the recognized affinity of *Euphaedra* and *Hamanumida* in the imago state confirmed by the discovery of the larva of the latter now admitting a comparison of the earlier stages of these two genera; and much interest attaches to the great similarity existing between the larvae of these exclusively African genera and those of the strictly Oriental genus *Euthalia*.¶

* Ent. Tidskr., 1894, t. 5, ff. 3, 4.

† Horsfield and Moore, Cat. Lep. E.I.C. Mus. I, Pl. VI, f. 2 (1857).

‡ Lep. Ceylon, I, Pl. 17, f. 2a.

§ "The larvae of *Symphædra* and *Euthalia* are similarly formed, and are among the most peculiar and interesting in butterflies. I have often found that of *E. garuda* at rest in the middle of a mango leaf, in which position it is very difficult to see, though its form is so remarkable; its body, with the pale dorsal line, answers to the midrib of the leaf, while the lateral branched spines pass for the other veins of the leaf on which it is resting, forming a remarkable instance of protective coloration, structure, and habit combined."—De Nicéville, Butt. India, etc., II, p. 192 (1886).

|| Food-plant determined by Mr. J. Medley Wood, of Durban, Natal.

¶ The likeness between the earlier stages in *Euphaedra* and *Euthalia* is noted by Aurivillius (Rhop. Aethiop., p. 500, 1899).

I am unable to give a complete description of the pupa of *H. daedalus*; but from a note and some outline sketches, and also an empty pupal skin, sent to me by Mr. Millar, it is clear that it is considerably more slender than that of *Euphaedra*, and quite devoid of the great widening and projection laterally, as well as dorsal acuminate elevation, of the 4th abdominal segment so marked in the known pupae of that genus,* and reaching a far greater development in the pupae of *Euthalia*.† The cephalic prominences are short but acute, and closer together than shown in the figures quoted of the two genera just mentioned. In profile the dorsal median outline is moderately elevated, arched, and ridged on thorax and abdomen. The length of the pupa-skin is 11 lines. The colouring is given by Mr. Millar as "pale-green, with a creamy streak down middle of back, and another round margin of wing-covers"; and he also notes that the pupal state, assumed on June 2nd, lasted until July 10th, 1907.

The larva was discovered at Malvern, near Durban, Natal, by Mr. H. M. Millar, brother of A. D. Millar.‡

FAMILY NOTODONTIDAE.

Genus HOPLITIS, Hübn.

Hoplitis phyllocampa, n. sp. Plate I, fig. 2 (♂), fig. 2a (♀).

Exp. al. 2 in. 3 lin. (one ♂, one ♀).

♂. *Fore-wing.* A moderate-sized basal patch, a rather broad inner-marginal border from base to beyond middle, and a conspicuous rather broad costal border from before middle to apex, all

* Aurivillius, *l.c.*, t. 5, ff. 3a, 3b, pupa of *E. ravola*; ff. 5, 5a, pupa of *E. aureola*.

† Moore, *l.c.*, t. VI, ff. 1a, pupa of *A. (E.) aconthea*; 2a, pupa of *A. (E.) garuda*.

‡ In his account of Lieut. A. Schultze's collection of Lepidoptera made in Camaroon, Bornu, etc., Aurivillius (*Arkiv. för Zool.*, bd. 2, n. 12, p. 7, 1905) gives a note by that observer that at Yola, on the Benue River, he found a young greenish-white larva with long white-plumed lateral spines, that rested flat on the leaf of its food-plant ("*Combretaceae*"), and that he thought was probably the larva either of a *Euphaedra* or of *Hamanumida daedalus*. The brief description of the young larva, together with the mention of its Combretaceous food-plant, incline one to the opinion that it belonged to *H. daedalus*.

greyish-white; the costal border considerably whiter than the other markings, and bounded costally anterior to its abrupt origin and thence inferiorly along its whole length to apex by wide dark-brown clouding which gradually pales into the grey tint of the discal and hind-marginal area; neuration not defined on the greyish-white markings, but elsewhere black, except for some whitish-discal scaling on the median nervules; basal patch with two transverse irregular black streaks, and bounded externally by a third; a submarginal irregularly-undulated whitish-grey streak, outwardly very finely and distinctly black-edged, but inwardly very indistinctly edged with dark-grey (except on and near inner-margin, where the dark edging is much widened); cilia brownish-grey with conspicuous white interruptions at extremities of nervules. *Hind-wing*: pure white; a slight fuscous edging on costa near apex; a well-marked triangular fuscous spot on hind-marginal edge, between first median nervule and submedian nervure, preceded by a very much smaller less distinct fuscous spot; inner-marginal border densely clothed and fringed with white hairs; cilia white, except for a fuscous interruption next to hind-marginal spot.

UNDERSIDE white. *Fore-wing*: three brownish spots on costal edge between middle and apex, and some ill-defined apical brownish clouding; cilia as on upperside. *Hind-wing*: markings as on upperside, but hind-marginal spots fainter, the smaller one obsolescent.

Head black, with two frontal short tufts of cream-coloured hairs; stem of antennae superiorly bright-red throughout, and with a small short tuft of bright-red hairs at its base,—the pectinations dark-brown superiorly but ochreous-yellow inferiorly. *Thorax* greyish-white with a short black median streak superiorly next to head. *Abdomen* white, with a broad black median dorsal band on basal third, but towards apex grey with two superior half-rings of brown.

♀. *Fore-wing*: darker, the basal and inner-marginal border and the upper portion of costal border considerably obscured with brownish; cilia less conspicuous, the nervular interruptions being smaller and yellowish-white. *Hind-wing*: a broad brownish-fuscous hind-marginal border, wider at apex, encloses the larger hind-marginal black spot but not the smaller anterior spot; cilia fuscous, whitish-tipped. UNDERSIDE.—*Fore-wing*: a submarginal brownish-fuscous band, broader apically and becoming macular inferiorly. *Hind-wing*: brownish-fuscous border as on upperside. Head, thorax, and abdomen as in ♂; and the antennae-stem superiorly, as well as the basi-antennal tuft, of the same bright-red.

LARVA. (Description of specimen preserved in formalin)
Pl. I, figs. 2b, 2c.

Total length 3 in.

Head large, rounded; about 3 lin. both in vertical and transverse diameters.

First thoracic segment not much larger than head, superiorly flattened almost horizontally but forming a slight elevated ridge immediately behind head; second segment considerably and third very much larger than head.

Abdominal segments 1-3 all larger and thicker than thoracic ones, and also than the three next succeeding abdominal ones;—the first abdominal segment with a moderate median conical dorsal elevation, surmounted by a small smooth mammillated wart. Abdominal segments 7-9 greatly modified in form, being not only larger and thicker than the three next preceding ones, but having their lateral margins widely produced so as to constitute a large common expansion, more than 1 in. long and nearly $\frac{3}{4}$ in. broad in widest part, thinning off to a leaf-like edge. No anal pro-legs, but possible rudiments of them in the shape of two very small minutely granulated ferruginous ridges. On flattened ventral surface this unified group of the last three segments presents the appearance of a sub-ovate acuminate leaf with irregularly flexed and sinuated margins, a median elevated longitudinal stripe of paler tint representing the midrib, and six pairs of slightly depressed transverse streaks, together with two similar basal but longitudinal ones, the branching veins; the whole surface being moreover finely pitted in resemblance to the stomata of a leaf. The humped back of the 8th segment bears at apex three minute mammillated warts, and the extremity of the anal segment two more prominent and acute warts.

General colour throughout a bright pale yellowish-green, apparently without markings.* Head brownish-red, widely reticulated with ferruginous lines; mandibles reddish-yellow with conspicuous black extremities. Legs reddish-yellow with rusty-black terminal claw; pro-legs mixed greenish and ferruginous. On almost horizontal ridged front of first thoracic segment, immediately above head, two widely-apart elevated ferruginous spots, in position and

* This is the case in the specimen under description, but in Mr. Millar's photographs of the living larva there appears a general close minute speckling of paler dots on a darker ground (looking not unlike the granulation in *Smerinthus* larvae); and there is also, in the photographs which show a considerable part of the dorsal aspect, a very distinct and broad pale longitudinal median band beginning on second abdominal segment. Possibly the photographs represent a larva not in the final moult. See Pl. I, figs. 2d, 2e.

eye-suggesting effect not unlike the correspondingly situated black spots in the larva of *Cerura vinula*.

The Imago is allied to *H. postica* (Walk.), a native of Natal and the Transvaal, but easily distinguished by its conspicuous grayish-white costal and inner-marginal borders in the fore-wing, and generally much lighter and brighter colouring, as well as by the bright red stem of the antennae, which in *N. postica* is pale arenaceous.

There is, however, in the British Museum an unnamed ♂ of a much closer congener, from "Coomassie (*H. Whiteside*)," which also has the antennae-stems red (though paler than in *H. phyllocampa*), but in which the field of the fore-wing is white, with scarcely a vestige of the dark-brown clouding, while there is a rather large fuscous spot in the discoidal cell near its extremity.*

A comparison of the Larva with Boisduval's description and figures † of that of *H. milhauscri* (Fab.), a well-known species of wide Palaearctic range, affords several points of agreement in the two caterpillars, *vid.*:—(1) the bright pale yellowish-green of the general colouring, (2) rufous head, (3) rufous spot on each side of anterior upper edge of first thoracic segment, (4) position on first abdominal segment of principal dorsal process, and (5) profile outline of elevated seventh, eighth, and ninth abdominal segments, especially dorsal prominence of eighth segment with its mammillated apex. But the differences are great, the *H. phyllocampa* larva presenting no approach to the long forked dorsal process occupying the first abdominal segment, nor any trace of the curved claw-like dorsal processes which succeed it on second, third, and fourth

* Prof. Aurivillius (*Arkiv. för Zoologi*, II, No. 12, p. 27, 1905) notes a Notodontid larva from Camaroon, and gives an illustration reproducing the sketch of it made by the discoverer, Lieut. A. Schultze. The profile and back views given are so very like the larva of *H. phyllocampa*, that I think it not improbably may prove to be the larva of the closely-allied *Hoplitis* above mentioned as a native of Coomassie. It is noticeable that the profile sketch of the Camaroon larva shows a much higher and larger prominence dorsally on first abdominal segment than the larva of *H. phyllocampa* possesses, and that it represents a very erect attitude of the entire fore-part anterior to the third abdominal segment—which does not appear (from Mr. Millar's photographs) to be assumed by the Natal larva—and a corresponding very much less recurved and indeed not far from perpendicular carriage of the expanded hind segments.

† Boisduv., Rambur, and Graslin:—"Collect. Iconogr. et Hist. des Chenilles d'Europe," *Pseudobomb.*, Pl. III, ff. 1, 2 (1832).

segments; neither does it possess the conspicuous reddish-creamy lateral band on abdominal segments 3-6 exhibited by *milhauseri*. On the other hand, the *milhauseri* larva possesses no indication of the leaf-like expansion of the abdominal segments 7-9 which is so very striking a feature of the *phyllocampa* larva.

When this leaf-like expansion is recurved over the back—an attitude which Mr. Millar writes is assumed when the larva is disturbed and also maintained when it is at rest—its extremity reaches so far forward as to cover the third abdominal segment. The reversed ventral surface thus exposed most successfully simulates in its contour, unevenly sinuated edges, and prominent venation, the leaf of its food-plant, *Combretum gucinzii*, Sond., and must largely screen the larva from detection, especially when the point of view is directly behind and rather below it.

A portion of the earthen cell in which this larva pupates has been sent to me by Mr. Millar; it is rather solidly and compactly made of minute particles of arenaceous soil cemented together, the interior surface being thickly and smoothly lined with the cementing secretion.

The larva was discovered at Malvern, near Durban, by Mr. H. M. Millar; the ♀ imago above described emerged on February 2nd, and the ♂ on October 16th, 1907.

Family COSSIDAE.

Genus EULOPHONOTUS, Felder.

Allied to *Zenzera*, Latr. *Head* small, hairy; eyes prominent; antennae rather short, in ♂ bipectinate from base to about half their length but thence simple, in ♀ simple throughout and very slender.

Thorax in ♂ large, broad, prominently prolonged anteriorly, densely clothed with short hairs, in ♀ much smaller and shorter in proportion, only slightly prominent anteriorly, clothed with very dense but longer hair.

Fore-wings much prolonged apically, the apex itself more acute in the ♀: radial (discoidal) nervure wanting, but its nervules originating from a common point,—the upper one angulated upward to join disco-cellular nervule, and the lower one angulated downward to join third median nervule; in ♂, the costal nervure and the subcostal nervure, with its first, second, and third branches are

much crowded together on costal margin. *Hind-wings* very small and short, but in the ♀ larger than in the ♂, and much more prominent apically; costa prominent before middle, but with an abrupt downward flexure just above extremity of discoidal cell; costal nervure not traceable, apparently atrophied; subcostal nervure arched upward in conformity with costal outline, so that discoidal cell is very broad. *Legs* rather long, the femora and tibiae hairy, the tarsi long and smooth.

Abdomen of moderate length in ♂, stout, blunt at extremity, hairy laterally and sparsely tufted at tips; much larger in ♀, with a median dorsal series of conspicuous dense tufts of terminally widened and flattened bristles, and with a very large sub-globose anal cushion of closely packed short hair, sparsely interspersed with some much longer hair.

In naming this genus Dr. Felder gave no diagnosis, but figured the type, as *Eulophonotus myrmeleon* (Reise der Novara, Lepid., Heft IV, p. 4, t. lxxxii, f. 9, 1874), from a single ♀ sent to him by me in 1867. I am therefore glad to have the opportunity of defining the features of both sexes, and of pointing out that, while not unlike *Zeuzera* in some respects (and exceedingly like in the *larva* stage), *Eulophonotus* is well distinguished by its widely differing neuration; the radial nervure, so greatly and remarkably developed in *Zeuzera*, being absent in both fore-wing and hind-wing, and the costal nervure in the hind-wing (also robustly developed in *Zeuzera*) being aborted, while the subcostal nervure is unusually strong, and arched upwards in accordance with the prominence of the costa. In both sexes the hind-wings are considerably smaller and shorter in proportion than they are in *Zeuzera*, but this reduction is less marked in the ♀. The abdomen is smaller than it is in *Zeuzera*: in the ♂, too, it is tufted at the extremity; while in the ♀ it exhibits not only a dorsal series of long dense tufts of remiform rigid bristles, but also the peculiar character of a very large rounded anal expansion of extremely dense short silky hair, resembling that exhibited by various ♀♀ of the remote family *Liparidae*. The extraordinary disparity between the sexes as regards size, and the striking dissimilarity of the pellucid almost scaleless wings of the ♂ to the black closely vitreous-spotted ones of the ♀, contribute to emphasize the distinctness of *Eulophonotus* as a decidedly aberrant genus of *Cossidae*.

Eulophonotus myrmoleon, Felder, Reise der Novara, Lepid., Heft IV, p. 4, t. lxxxii, f. 9 [♀] (1874.)

Exp. al. (♂) 1" 3''; (♀) 2" 1½''. Plate I, fig. 3 (♂), fig. 3a (♀).

♂. *Wings almost wholly hyaline.* *Fore-wing*: a very few black scales along costal margin, and a narrow edging of dense black scaling along inner margin. *Hind-wing*: a densely scaled black edging along costa, broad at base and narrowing to a point a little beyond extremity of discoidal cell; anal-angular and inner-marginal area also black with intermixed greyish hairs. Neuration yellowish, with some sparse black scales. Underside the same.

Head, palpi, and antennae dark brown. *Thorax* yellowish-brown above, but fuscous in front, on sides, and beneath; *legs* brown, the femora densely tufted with mixed greyish and yellowish hair. *Abdomen* black above and on sides, yellowish-grey beneath, tufted with short bristly black hairs laterally, and with long ones at extremity.

♀. *Wings black*; the *fore-wing* with numerous irregularly grouped small hyaline spots, most prevalent in discal area. *Fore-wing*: on costal margin, from base to middle, 6 separate short hyaline marks of varying width; below these, in discoidal cell, a series of 6 minute spots in pairs; below median nervure 3 sub-basal larger and more elongate spots; the numerous irregularly placed discal and submarginal spots form little clusters most diverse in the number and size of their respective components; immediately beyond the outermost of these succeeds a more regular series of seven little groups situated along hind-marginal edge; an inwardly oblique ante-median rather wide irregular space from subcostal to sub-median nervure is without spots, and so is a narrower outwardly oblique sub-apical space from costa to near middle of hind-marginal. *Hind-wing*: black duller, shading into greyish-fuscous outwardly, unspotted; costa with a rather narrow shining silvery-grey border from base as far as the abrupt downward flexure. **UNDERSIDE** like the upperside, except that in *fore-wing* the inner margin is shining fuscous-grey below submedian nervure, and in *hind-wing* the costal border is not silvery-grey but dull fuscous like rest of wing.

Head, palpi, and antennae black. *Thorax* above has been almost denuded in the specimen under description (but in Felder's figure of the type example is shown as very densely clothed with mixed fuscous and yellowish-grey hair); it retains some rather long intermixed thin grey and terminally thickened black hairs in front and laterally; beneath, also, there are remains of similar hairy clothing; *legs* black, the femora and tibiae densely tufted with hairs similarly mingled. *Abdomen* has been denuded laterally, but retains along

median dorsal line a series of dense tufts of long erect remiform black bristles; anal expansion large, rounded, with a dense felting of short silky yellowish hair, tightly compressed into successive transverse rings, and interspersed rather sparsely with fuscous hair, more developed dorsally than ventrally.

LARVA.—Plate I, fig. 3b. Cylindrical, thick. Head large, protuberant, smooth; first thoracic segment very large, bearing dorsally a large nearly semicircular smooth horny plate, with the anterior edge almost straight and the lateral and posterior margin strongly curved,—the middle of the latter being finely tuberculated; spiracles on this segment and on the eighth abdominal segment much larger, and those on the first abdominal segment rather larger than the rest; second thoracic segment considerably larger than any of the succeeding segments. Thoracic legs well developed, rather long, the extremities very acute; abdominal pro-legs short, the anal pair more prominent and close together. General colouring the usual dull yellowish-whitish of wood-boring larvae, with the head, prothoracic dorsal shield, and anal segment reddish-brown. A series of raised fuscous spots on each side of back, arranged obliquely in pairs (each posterior spot of a pair considerably larger than the anterior one) and becoming gradually more elevated and distinctly tuberculous on each segment towards the hind extremity; a lateral series of similar rather smaller spots arranged vertically in pairs—each pair consisting of a supra-spiracular spot and an infra-spiracular one; and an inferior-lateral series of minute single fuscous spots, one just above each leg. Length $1\frac{1}{2}$ in.

Described from a single specimen (from its size almost certainly a ♀) in spirit. Mr. Millar writes that it was found tunnelling in the wood of a tree known as the “Natal Mahogany” (*Trichilia emetica*, Vahl.); it was about an inch and half below the bark, and its tunnel was eight inches in length.

PUPA.—(Empty skin only;—evidently that of a ♀.) Very like that of *Zeuzera aesculi*. Towards the anterior part of each abdominal segment is a slender roughened horny transverse ridge encircling the segment except for a rather wide ventral gap; and towards the hind part of each of the fourth, fifth, and sixth segments a similar but shorter transverse ridge confined to the dorsal region; the sites of the second, third, and fourth pairs of larval pro-legs are also marked by small similar but semicircular roughened ridges, and that of the anal rudimentary pair is indicated by two small roughened tubercles.

Mr. Millar found this empty pupa-skin projecting from the bark of the tree above mentioned immediately below

the freshly emerged ♀ *E. myrmeleon* here described, which was paired with the transparent-winged previously unknown ♂; this was on November 6th, 1907.

Felder (*loc. cit.*, p. 4) gave "Cape of Good Hope" as the *habitat* of the type specimen (♀) of this moth which I sent to him, but my distinct impression is that I received it in a small collection made at Port Natal. I have, however, lately seen in the British Museum a ♀ labelled "Kowie River,"—a locality situated on the eastern coast of Cape Colony.

There is also in the British Museum a ♂ *Eulophonotus*, which though larger than *E. myrmeleon* seems closely allied; it bears the locality label of "Gold Coast."

EXPLANATION OF PLATE I.

[See *Explanation facing the PLATE.*]